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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,662	11/21/2003	Hoon Song	249/425	9070

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EXAMINER	
STEPHENS, JUANITA DIONNE	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/717,662	SONG ET AL	
	Examiner	Art Unit	
	Juanita D. Stephens	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Election filed 4/1/2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) *18-41* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 42-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/21/03 & 6/10/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-17 and 42-48 in the reply filed on 4/1/2005 is acknowledged.

2. Claims 18-41 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 4/1/2005.

Claim Rejections - 35 USC § 112

3. Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 it cannot be clearly understood what the difference is between the nozzle plate and the metal layer. The claim language leads one to believe there are two separate layers. However, it appears from the Specification that they are the same.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-10, 13, 16-17, and 42-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US 6,019,457) in view of Tsung Pan (US 4,894,664).

Silverbrook discloses a monolithic ink-jet printhead (Fig. 17), comprising: **1)** a substrate (130) having a lower ink chamber (115) to supplied with ink (106) formed on an upper surface thereof, **2)** a manifold (114) for supplying ink to the lower ink chamber formed on a bottom surface thereof, **3)** an ink channel (113) which perpendicularly penetrates the substrate for providing communication between the lower ink chamber and the manifold, **4)** passivation layer (132 and 144) (col 7, lns 50-56, as seen in Fig. 12) stacked on the substrate, **5)** a heater (12) provided between adjacent passivation layers of the plurality of passivation layers, **6)** a connection hole (formed by 111, as seen in Fig. 17), **7)** wherein the connection hole (111) may have a circular, oval or polygonal shape (as seen in Fig. 11), **8)** wherein the heater (120) surrounds the connection hole (as seen in Figs. 10 and 11), **9)** wherein the ink channel (113) comprises a single ink channel formed at a location corresponding to a center of the lower ink chamber (as seen in Fig. 7), and **10)** wherein the connection hole (111) is formed at a location corresponding to a center of the ink chamber (115), and the heater (120) has a ring shape surrounding the connection hole (as seen in Figs. 10 and 11), and 12).

Silverbrook discloses the claimed invention, with the exception of **1)** a nozzle plate stacked on the substrate and a metal layer, **2)** the nozzle layer having an upper ink chamber formed therein on a bottom surface of the metal layer, **3)** a nozzle in communication with the upper ink chamber formed on an upper surface of the metal layer, **4)** a conductor provided between adjacent passivation layers of the plurality of passivation layers, the conductor being electrically connected to the heater to apply a

current to the heater, **5)** wherein the upper ink chamber has a diameter the same as or smaller than a diameter of the lower ink chamber, **6)** wherein the connection hole is formed at a location corresponding to a center of the upper ink chamber, **7)** wherein the connection hole comprises a plurality of connection holes formed adjacent an edge of the upper ink chamber, **8)** wherein the plurality of connection holes are formed around the heater and spaced apart a predetermined distance from the heater, **9)** wherein at least a portion of each of the plurality of connection holes is disposed within the boundary of the heater, and the heater defines a plurality of apertures, **10)** wherein each of the plurality of apertures is either a hole surrounding an entire one of the plurality of connection holes or a groove surrounding a portion of one of the plurality of connection holes, **11)** wherein the metal layer is made of one selected from the group consisting of nickel, copper, and gold, **12)** wherein the metal layer is formed by electroplating to a thickness of about 30-100 um, **13)** wherein the heater has a rectangular shape, and **14)** wherein the heater has a rectangular shape, and a plurality of connection holes are formed adjacent an edge of the heater).

Tsung Pan at least teaches 1) a nozzle plate (19) stacked on the substrate (10) and a metal layer (19), 2) the nozzle layer having an upper ink chamber (located above heater 15 and protective layer 15) formed therein on a bottom surface of the metal layer, 3) a nozzle (17) in communication with the upper ink chamber formed on an upper surface of the metal layer, 4) a conductor (23) provided between adjacent passivation layers (barrier layer 21 and protective layer 25) of the plurality of passivation layers (col 2, lns 57-66), the conductor being electrically connected to the heater to

apply a current to the heater (col 3, lns 41-46), 5) wherein the upper ink chamber (located above heater 15 and protective layer 15) has a diameter the same as or smaller than a diameter of the lower ink chamber, 6) where in the connection hole (formed by opening extending upward from well 11, as seen in Fig. 9) is formed at a location corresponding to a center of the upper ink chamber (located above heater 15 and protective layer 15), 7) wherein the connection hole (formed by opening extending upward from well 11, as seen in Fig. 9) comprises a plurality of connection holes formed adjacent an edge of the upper ink chamber (as seen in Fig. 3), 8) wherein the plurality of connection holes are formed around the heater and spaced apart a predetermined distance from the heater (as seen in Fig. 3), 9) wherein at least a portion of each of the plurality of connection holes is disposed within the boundary of the heater, and the heater defines a plurality of apertures, each of the plurality of apertures exposing one of the plurality of connection holes (as seen in Fig. 3), 10) wherein each of the plurality of apertures is either a hole surrounding an entire one of the plurality of connection holes or a groove surrounding a portion of one of the plurality of connection holes (as seen in Fig. 3), 11) wherein the metal layer (19) is made of one selected from the group consisting of nickel, copper, and gold (abstract, col 3, ln 67-col 4, ln 2), 12) wherein the metal layer is formed by electroplating to a thickness of about 30-100 um (col 3, ln 67-col 4, ln 2) (i.e, 1.5 mil converts to 38.1 micrometer (μm) and 2 mil converts to 50.8 micrometer(μm)), 13) wherein the heater (60) has a rectangular shape (as seen in Fig. 12), and 14) wherein the heater has a rectangular shape, and a plurality of connection holes are formed adjacent an edge of the heater (as seen in Figs. 3 and 12). It would

have been obvious at the time the invention was made to a person having ordinary skill in the ink jet art to modify Silverbrook by providing the nozzle plate/metal layer, conductor and connection hole(s) as taught to be old by Tsung Pan for the purpose of eliminating adhesion, ink flow and alignment problems. The combination of Silverbrook and Tsung Pan discloses the limitations of independent claims 42 and 46.

6. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US 6,019,457) in view of Tsung Pan (US 4,894,664) as applied to claims 1-10, 13, 16-17 and 42-48 above, and further in view of Maeng et al. (US 6,652,077 B2).

Silverbrook in view of Tsung Pan discloses the claimed invention, with the exception of wherein the lower ink chamber includes a plurality of hemispherical cavities in communication with a circumferential direction below a respective one of the plurality of connection holes, and wherein the ink channel is formed at a central portion of a bottom of each of the plurality of connection holes. Maeng et al. at least teaches wherein the lower ink chamber includes a plurality of hemispherical cavities (114) in communication with a circumferential direction below a respective one of the plurality of connection holes (122), and wherein the ink channel (116) is formed at a central portion of a bottom of each of the plurality of connection holes (col 4, lns1-6, Fig. 3). It would have been further obvious at the time the invention was made to a person having ordinary skill in the ink jet art to modify Silverbrook in view of Tsung Pan by providing the plurality of ink chambers as taught to be old by Maeng et al. for the purpose of

preventing satellite ink droplets, crosstalk and backflow of ink, while providing high speed printing and shortening the refill cycle.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US 6,019,457) in view of Tsung Pan (US 4,894,664) as applied to claims 1-10, 13, 16-17 and 42-48 above, and further in view of Min et al. (US 6,595,627 B2).

Silverbrook in view of Tsung Pan discloses the claimed invention, with the exception of wherein the ink channel comprises a plurality of ink channels formed on a bottom surface of the lower in chamber. Min et al. at least teaches wherein the ink channel comprises a plurality of ink channels (110) formed on a bottom surface of the lower ink chamber (106)(col 5, lns 29-34, Fig. 4). It would have been further obvious at the time the invention was made to a person having ordinary skill in the ink jet art to modify Silverbrook in view of Tsung Pan by providing the plurality of ink channels as taught to be old by Min et al. for the purpose of preventing satellite ink droplets, crosstalk and backflow of ink, while providing high speed printing and shortening the refill cycle.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US 6,019,457) in view of Tsung Pan (US 4,894,664) as applied to claims 1-10, 13, 16-17 and 42-48 above, and further in view of Murthy et al. (US 6,120,135). Silverbrook in view of Tsung Pan discloses the claimed invention, with the exception of wherein the nozzle has a tapered shape in which a cross-section area decreases gradually toward an exit. Murthy et al. at least teaches wherein the nozzle (32) has a tapered shape in which a cross-section area decreases gradually toward an exit (as

seen in Figs. 8 and 14). It would have been further obvious at the time the invention was made to a person having ordinary skill in the ink jet art to modify Silverbrook in view of Tsung Pan by providing the tapered nozzle as taught to be old by Murthy et al. for the purpose of increasing discharge speed and provide a more focused ejection of ink.

Comments

9. Applicant should in response to the Non-final Office Action cancel, non-elected claims 18-41.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juanita D. Stephens whose telephone number is (571) 272-2153. The examiner can normally be reached on Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juanita D. Stephens
Primary Examiner
Art Unit 2853

April 27, 2005